1. Please provide additional details on the homogenization process for soil sample collection in the field, and in the lab.

- Field Procedures: Applicable Parent Work Plan (WP) sections are Sections 3.6.5.1, 3.6.6.1, 3.6.6.3, 3.7, and the SAP Addendum WS#21, 21.1 Shallow Soil Sampling (Appendix B to the WPA). A summary of details include:
    - Samples will be collected using a plastic disposable scoop throughout the 9" lift; soil will be homogenized during sampling.
        - 25 systematic samples and 2 field duplicates are collected per RSY pad.
        - At each location, soil is removed using mechanical hand tools.
        - A small pile of soil is placed next to the "sampling hole" onto a clean square of visqueen (or other appropriate clean disposable material).
        - Individual samples are photographed using the tablets.
        - If present, large rocks or debris will be removed, large chunks of soil will be broken up and mixed.
        - Using disposable scoops, sample jars for lab analysis will be filled.
        - If splits/duplicate are needed at the location, the same process will be employed except extra volume of soil will be processed. For field duplicate samples or split samples, an alternate spooning technique will be used to split the soil between the primary sample container and the field duplicate or split sample container.
        - Label and custody seal/tape applied to each sample container
        - Each survey unit (group of 27 samples) is combined into a custody bag, sealed, and shipped to the laboratory for analysis.
    - Field duplicates will be collected at a rate of 10%; split samples will be coordinated with the agencies.
    - Sample nomenclature is dependent on the original soil location and will be completed in accordance with WP Sections 3.6.6.1 and 3.6.6.3.
- Laboratory SOP for dying and grinding samples: Included as SAP Addendum Attachment 2, SOP No. ST-RC-0003, Rev 17, Drying and Grinding of Soil and Solid Sampling for Radiochemistry Analysis.
    - SOP Section 11.0 Procedure details the sizing of sample, drying of samples, the ball mill procedures.
        - Samples are dried in drying oven for minimum of 8 hours.
        - After drying, rolling rocks are placed into a gallon paint can and rolled on the ball mill for a minimum of 8 hours for homogenization
        - Rolling rocks are removed and the homogenized sample is used for analysis, no further incremental sampling method type process is performed.
        - Samples are not sieved or pulverized.
- There is no difference in the laboratory sample prep for the original aliquot vs the four additional aliquots. The lab goes back to the original sample, already prepped (dried and homogenized), and takes another aliquot for analysis.

2. Please provide the count uncertainty and total uncertainty equations used by the lab for the soil sample analysis.

Per the EUROFINS, Test America Quality Assurance Manual, Document No. ST-QAM, Revision No. 13, Effective Date: 01/28/2021, the following can be found:

$$\text{UncCnt}\ (1\sigma) = \frac{\sqrt{\frac{Cs}{Ts^2} + \frac{Cxt}{Ts^2} + \frac{Cb}{Tb^2} + Chi^2}}{\text{D} * \text{E} * \text{I} * \text{V} * \text{R} * \text{A}} * DF * UCF$$

$$\text{UncTot}\ (1\sigma) = \sqrt{\text{UncCnt}^2 + (TPUFact * Activity)^2}$$

Where:

Cs = Sample Counts
Cb = Background Counts
Cxt = Crosstalk Counts (interference correction)
Ts = Sample Count Duration
Tb = Background Count Duration
D = Decay
E = Efficiency
I = Ingrowth

V = Aliquot Volume
R = Recovery
A = Abundance (Branching Ratio)
DF = Dilution Factor
UCF = Units Conversion Factor
Chi = non-Poisson variance

For the count uncertainty, if both Cs and Cb = 0, then 1 is forced into Cs.
For the DLC, if Cb =0, then 1 is forced into Cb.

RadCapture Tals allows for interference corrections, which are applied through the "crosstalk" (Cxt) factor. This calculation is consistent with interference corrections discussed in MARLAP chapters 19 and 20, where the interference factor is shown as R_I (count rate of the interference) in equations 20.6 and 20.7. In the laboratory equations this factor is CPMxt (or Cxt/Ts). Interference corrections may be applied on a batch by batch basis, and are normally performed upon client request, when lower detection criteria are needed (small interferences become significant at lower levels), or when the interference is more pronounced.

Interferences may include, but are not limited to, impurities in reagents, tracers, or glassware such as naturally occurring isotopes of uranium, thorium, and radium. It can also account for interferences such as tailing of Th-229 into the Th-230 region of interest (ROI) or for impurities seen in tracers/carriers. Acceptable means of determining interference correction factors may include the use of manufacturer certificates or a blank population type study.

The non-Poisson variance (Chi) is available for client-specific needs. It is included for all methods to create consistency in the calculation equations. This factor is based upon non-Poisson variances as discussed in MARLAP chapters 19 and 20, and outlined in equations 20.6 and 20.7.

3. Please provide any details available on the sample weight sent to the lab and the sample weight of the aliquot analyzed at the lab for each Sr-90 exceedance sample and 4 additional aliquots.

   - APTIM does not weigh samples in the field before sending to the lab. The samples are sent in a 16oz container. The lab does not weight the samples upon receipt. Per the SAP the volume used for Strontium-90 analysis is 1 gram. The exact sample weight for aliquots prior to analysis are collected by the lab. The sample weights are summarized in the following table:

Sample ID	Sample Weight (g)
HPPG-ESU-TU079A-001	0.9940 g
HPPG-ESU-TU079A-001 (Additional Aliquot 1)	1.0852 g
HPPG-ESU-TU079A-001 (Additional Aliquot 2)	1.0893 g
HPPG-ESU-TU079A-001 (Additional Aliquot 3)	0.9976 g
HPPG-ESU-TU079A-001 (Additional Aliquot 4)	1.0472 g
HPPG-ESU-TU124A-021	1.0105 g
HPPG-ESU-TU124A-021 (Additional Aliquot 1)	1.0482 g
HPPG-ESU-TU124A-021 (Additional Aliquot 2)	1.0053 g
HPPG-ESU-TU124A-021 (Additional Aliquot 3)	1.0153 g
HPPG-ESU-TU124A-021 (Additional Aliquot 4)	1.0007 g